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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/623,601	07/22/2003	Osamu Okamoto	030875	5833

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EXAMINER	
KIM, TAE JUN	

ART UNIT	PAPER NUMBER
3746	

DATE MAILED: 05/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/623,601	OKAMOTO ET AL.	
	Examiner	Art Unit	
	Ted Kim	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-12 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-12 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 7/22/03.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-6, 8-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Billig et al (5,214,914). Billig et al teach a combined engine for a single-stage spacecraft, comprising an air intake section 13, an engine main body section including a combustion chamber (downstream of struts 18), and an exhaust nozzle section, in this order, wherein rocket engines 9, 10, **15** that inject the engine exhaust flows as rocket jets (col. 3, lines 11-32 into said combustion chamber are arranged on struts that partition said air intake section into a plurality of air introduction channels between struts 18, 21; said combustion chamber comprises a jet and airflow coexisting section in which both said rocket jets 9 and airflows introduced through said air introduction channels are present, a mixing section in which said rocket jets and said airflows are mixed to form mixed gas, and a combustion section in which said mixed gas is burnt; wherein each flow rate of said airflows is inherently controlled by varying the air channel area of said airflow immediately upstream of said mixing section by varying the shape of said rocket jets, note that as a similar structural arrangement is used by Billig, such a structure is inherently capable of performing the same function. Note that in Billig, the jets 14 and 9

both serve to control the air channel area. Alternately, the jets 9 would be varied merely by injecting more or less propellant from the rockets 15 and thus also vary the air channel area. Said mixing section and said combustion section inherently have an equivalent function to a variable shape intake/diffuser required for a Brayton cycle engine in supersonic or ultra-supersonic flight by varying the shape of said rocket jets; the necessary combustion pressure is secured by the mixture mainly with the pressure of said rocket jets in order to secure the operation of said combined engine at ultra-supersonic flight speeds of flight Mach number 12 or more (col. 6, lines 61-col. 7, lines 3). Billig further reads on changing the combustion chamber pressure of said rocket engines inherently changes the shape of said rocket jets; the air/fuel flow rate ratio in said mixing section is inherently controlled by altering the equivalent ratio of oxidizer and fuel in the combustion chamber of said rocket engines; wherein the exhaust gas of said rocket engines inherently works as a huge flame holder simultaneously as a huge igniter for said air/fuel combustion chamber – by definition, as there is no other structure disclosed which could perform the function of a flameholder, the injectors/rocket engines 19 are the flameholder (otherwise the flame would be blown out); said rocket jets generate Mach disks (shocks 19) upstream of said mixing section in a subsonic or supersonic flight speed region.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-6, 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Billig et al (5,214,914). Billig et al teach various aspects of the claimed invention and is inherently capable of performing the functions of wherein each flow rate of said airflows is inherently controlled by varying the air channel area of said airflow immediately upstream of said mixing section by varying the shape of said rocket jets, note that as a similar structural arrangement is used by Billig, such a structure is inherently capable of performing the same function. Note that in Billig, the jets 14 and 9 both serve to control the air channel area. Alternately, the jets 9 would be varied merely by injecting more or less propellant from the rockets 15 and thus also vary the air channel area. Said mixing section and said combustion section inherently have an equivalent function to a variable shape intake/diffuser required for a Brayton cycle engine in supersonic or ultra-supersonic flight by varying the shape of said rocket jets; changing the combustion chamber pressure of said rocket engines inherently changes the shape of said rocket jets; the air/fuel flow rate ratio in said mixing section is inherently controlled by altering the equivalent ratio of oxidizer and fuel in the combustion chamber of said rocket engines; wherein the exhaust gas of said rocket engines inherently works as a huge flame holder simultaneously as a huge igniter for said air/fuel combustion chamber. In order to obviate any doubt, these results are also obvious to those of ordinary skill in the art as it

is completely well known in the art to control the rocket jet area exiting by varying the propellant rate or combustion pressure or temperature, etc. The fluidic regions between the struts/rocket engines would obviously be controlled by the shape and dispersion of the rocket jets; pressure effects from the combustion region will propagate upstream to between the struts, varying the air/fuel ratio in the mixing section is of course controlled by how much is injected from the rocket jets. Hence, to the extent which these may not be explicitly disclosed, these would be understood to be either present or obvious to employ by one of ordinary skill in the art as the conventional practice in the art. Claim 12 is a desired result and will be satisfied by using the number of engines that can take the engine to earth orbit. It would have been obvious to one of ordinary skill in the art to employ the number of engines that will take the engine to earth orbit as a well known target location for such engines.

5. Claims 1-5, 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bulman (5,205,119) in view of either Bouchez et al (5,899,061) or Billig et al (5,214,914). Bulman teaches a combined engine for a single-stage spacecraft, comprising an air intake section upstream of struts 26, an engine main body section including a combustion chamber (downstream of struts 26), and an exhaust nozzle section (see e.g. downstream end of Fig. 5a-5d), in this order, wherein rocket engines (see col. 7, lines 60+) that inject the engine exhaust flows as rocket jets 20 into said combustion chamber are arranged on struts (26a, b, c, ...n) that partition said air into a plurality of air introduction channels between struts; said combustion chamber comprises

a jet and airflow coexisting section in which both said rocket jets 20 and airflows introduced through said air introduction channels are present, a mixing section in which said rocket jets and said airflows are mixed to form mixed gas, and a combustion section in which said mixed gas is burnt; wherein each flow rate of said airflows is controlled by varying the air channel area of said airflow immediately upstream of said mixing section by varying the shape of said rocket jets (see Figs. 5a-5d); said mixing section and said combustion section inherently have an equivalent function to a variable shape intake/diffuser required for a Brayton cycle engine in supersonic or ultra-supersonic flight by varying the shape of said rocket jets; changing the combustion chamber pressure of said rocket engines inherently changes the shape of said rocket jets; the air/fuel flow rate ratio in said mixing section is inherently controlled by altering the equivalent ratio of oxidizer and fuel in the combustion chamber of said rocket engines; wherein the exhaust gas of said rocket engines inherently works as a huge flame holder simultaneously as a huge igniter for said air/fuel combustion chamber – by definition, as there is no other structure disclosed which could perform the function of a flameholder, the injectors/rocket engines 16 are the flameholder (otherwise the flame would be blown out); said rocket jets generate Mach disks (e.g. shocks 56) upstream of said mixing section in a subsonic or supersonic flight speed region. It is not clear whether the struts 26a...n are located in the air intake section. Bouchez et al is cited to show that is old and well known in the art to place the struts 6 in the air intake section. Billig et al teach an arraignment where the struts 18, 21 are placed in the intake section. It would have been

obvious to one of ordinary skill in the art to place the struts of Bouchez et al in the air intake section, as a well known location for the fuel injection and/or rocket engine struts. Claim 12 is a desired result and will be satisfied by using the number of engines that can take the engine to earth orbit. It would have been obvious to one of ordinary skill in the art to employ the number of engines that will take the engine to earth orbit as a well known target location for such engines.

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over either Billig et al (5,214,914) or Bulman (5,205,119), as applied above, and further in view of Cohen et al (3,752,172). Billig et al and Bulman teach various aspects of the claimed invention but do not teach the perspiration cooling of the mixing section and combustion section. Cohen et al teach controlling the shocks 30 caused by the boundary layer 26 accompanying perspiration/transpiration cooling from 22, 24 in the mixing section and combustion section which are associated with the fuel which can also be transpiration material (col. 3, lines 42-50). It would have been obvious to one of ordinary skill in the art to control the shocks using transpiration cooling of the mixing section and combustion section, in order to prolong the life of the combustor/mixing section walls.

Contact Information

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Ted Kim whose telephone number is 571-272-4829. The

Examiner can be reached on regular business hours before 5:00 pm, Monday to Thursday and every other Friday.

The fax numbers for the organization where this application is assigned are 703-872-9306 for Regular faxes and 703-872-9306 for After Final faxes.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler, can be reached on 571-272-4834.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist of Technology Center 3700, whose telephone number is 703-308-0861. General inquiries can also be directed to the Patents Assistance Center whose telephone number is 800-786-9199. Furthermore, a variety of online resources are available at http://www.uspto.gov/main/patents.htm

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